Small Business Innovation Research/Small Business Tech Transfer

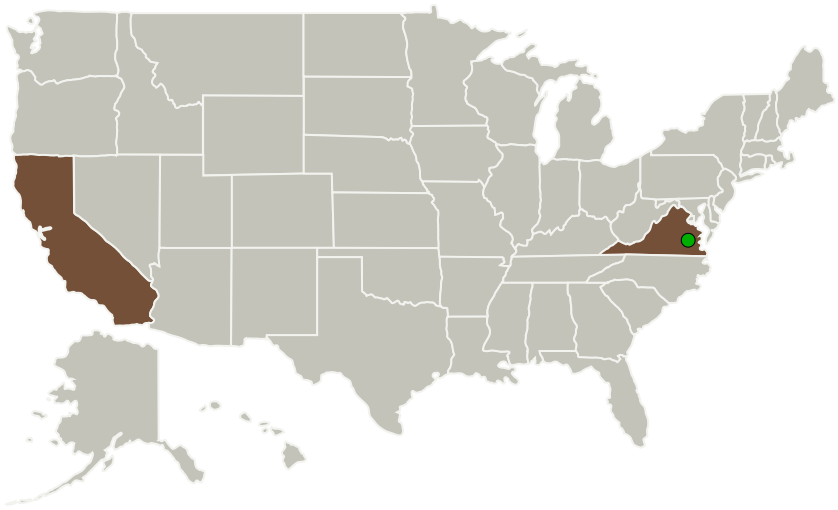
Solar Transportable Array Rover for Conformable Deployment Retraction on Mars, Phase I

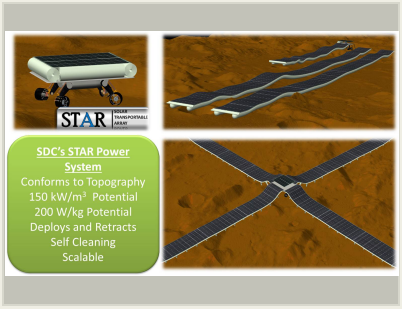
Completed Technology Project (2017 - 2017)

Project Introduction

SDC?s Solar Transportable Array Rover (STAR) Power system is an inflatable structure integrated with state-of-the-art solar blanket technology. The inflatable structure and solar blanket are stored in a roll as small as 0.5 m in diameter and 3 m wide for a 2500 m2 array, achieving a 150 kW/m3 packaging efficiency. The bladder membrane thickness will be optimized for the prescribed pressure, realize a rolled packaging volume as low as 5 m3, hold the solar cells more than 1 m off the ground, and weigh as little as 500-750 kg for a 2500 m2 array. The optimized rolled packaging makes the STAR Power system installable across landers, transport vehicles, habitats, and power plant sites, providing a universal power solution for Mars habitation and exploration. In this Phase I SBIR, SDC will design, analyze, manufacture, and demonstrate a sub-scale STAR Power system inflatable structure. The design and analysis of the support inflatable bladders will focus on weight optimization to meet the pressurization requirements. The deployment/retraction demonstration will be conducted over both even and uneven terrain, and enable evaluation of initial packing factor, repacking factor, conformability, reliability, and durability.

Primary U.S. Work Locations and Key Partners





Solar Transportable Array Rover for Conformable Deployment Retraction on Mars, Phase I Briefing Chart Image

Table of Contents

Small Business Innovation Research/Small Business Tech Transfer

Solar Transportable Array Rover for Conformable Deployment Retraction on Mars, Phase I

Completed Technology Project (2017 - 2017)

Organizations Performing Work	Role	Type	Location
San Diego Composites, Inc.	Lead Organization	Industry	San Diego, California
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
California	Virginia

Images

Briefing Chart Image
Solar Transportable Array Rover for Conformable Deployment Retraction on Mars, Phase I Briefing Chart Image
(https://techport.nasa.gov/image/128336)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
San Diego Composites, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

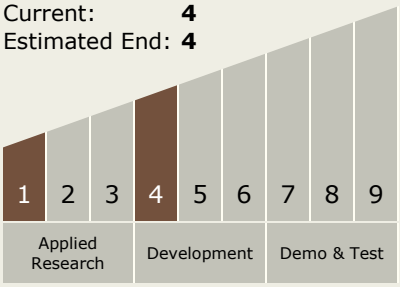
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Quinn Mcallister

Technology Maturity (TRL)

Start: **1**
Current: **4**
Estimated End: **4**



Solar Transportable Array Rover for Conformable Deployment Retraction on Mars, Phase I

Completed Technology Project (2017 - 2017)

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.2 Structures
    - TX12.2.1 Lightweight Concepts

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System